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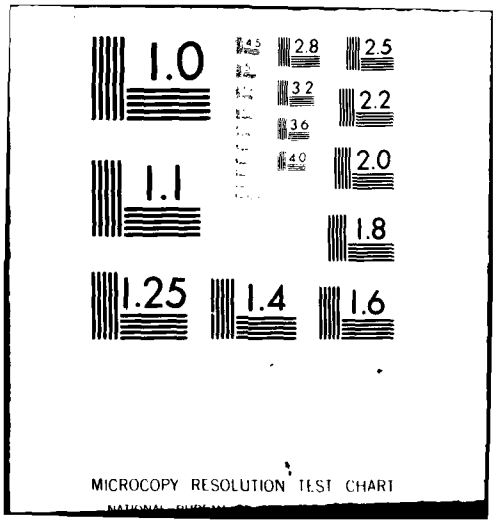
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EXPOSURE

vol.9 no.1 a newsletter for ocean technologists

The Fast and Easy Binary File

To a programmer working with relatively large amounts of serial data, such as those arising from oceanographic observations, the availability of a simple means to store, access, and manage these data is highly desirable. The basic requirements of such a system should include: a common file structure for all types of data, simple and efficient access and storage procedures, standardized manipulation and display programs, and adaptability to diverse applications. The fast and easy Binary File (FEB) software package described below embodies these features.

A block diagram of a typical program configuration using the FEB routines is shown in Figure 1. The user sets up several labeled

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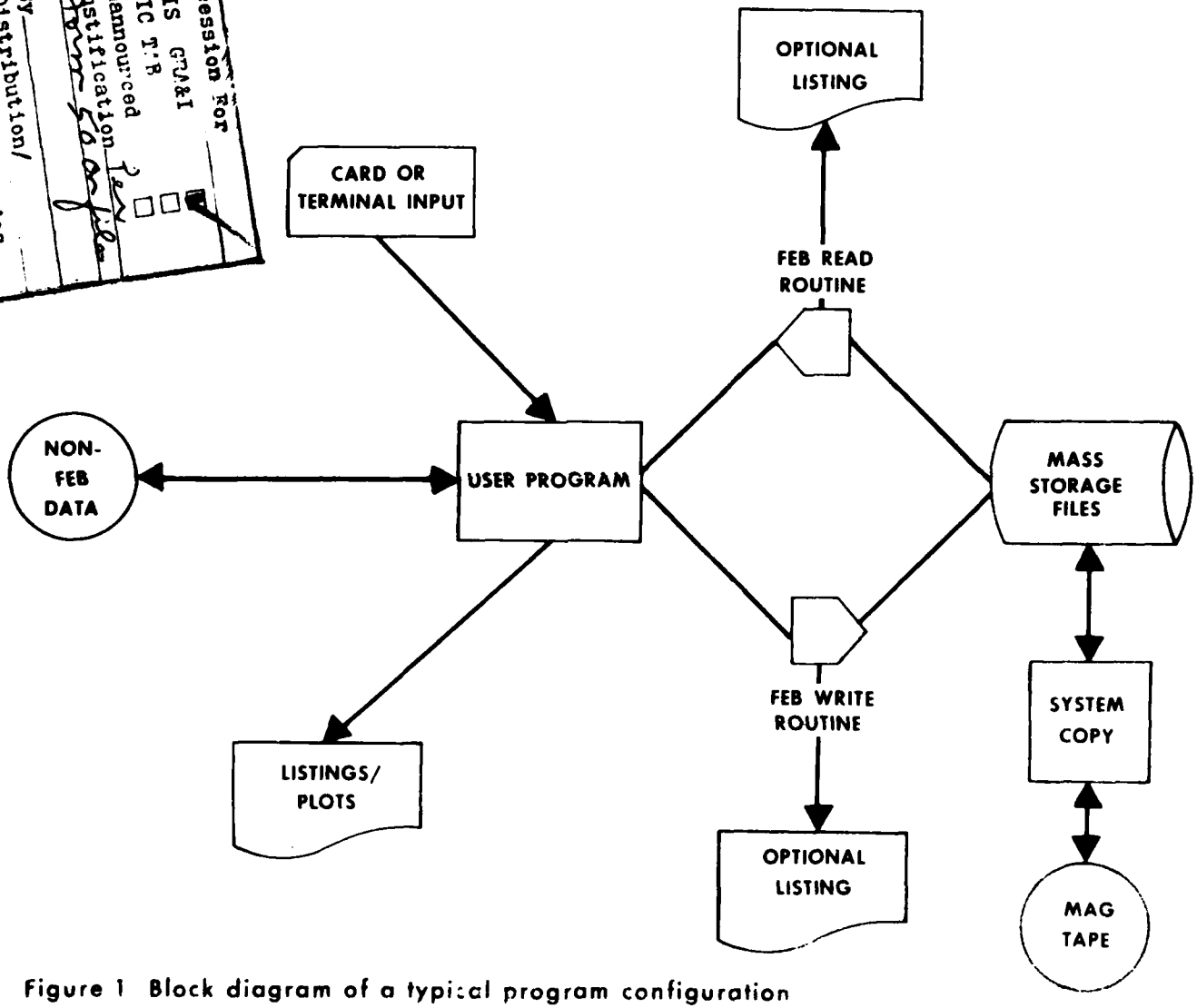

Figure 1 Block diagram of a typical program configuration

COMMONS in his program, includes calls to the input/output subroutines (IOSRs), and associates FORTRAN logical units with input and output files prior to execution. Each call to an IOSR transfers one segment of data between the user defined COMMON areas and the appropriate data file. The IOSRs have features which allow the user to list the data as it is being read, simply by setting a flag.

There exists a suite of utility programs for manipulating, editing, and displaying the contents of FEB files. These are main programs which function with FEB files in general, regardless of data type.

The existing FEB system is presently being used with mass storage (disk) files on a UNIVAC 1100 series computer, but it can be adapted to other machines and to tape files, if desired.

A FEB file is a working data file which is intended for repeated access. The basic handling software is simple, brief, and written in FORTRAN.

A FEB file consists of a series of variable length blocks or records written with a nonformatted FORTRAN write statement. These blocks are grouped into "segments" with one or more segments per file. A segment, the basic component of a FEB file, is treated as a unit within a user program. The size of a segment is limited by that which will fit practically in core (internal computer memory). The foregoing is summarized in Figure 2.

The control block contains pointers and identifiers for the segment, which are for the user program as well as for the handling software. The three header blocks are for the storage of auxiliary data (e.g., documentation, descriptions, calibration data, etc.) associated with the segment. The header blocks are optional. The data block contains the bulk of the information in two segments.

The data block can be thought of as N scans or cycles of L words or variables per scan. While L is usually the same throughout a file, both L and N can be different for each segment. A simple example would be a segment of bathythermograph data (temperature vs. depth). When L = Z and the data block is:
Z_1, T_1, Z_2, T_2, ..., Zn, Tn

Immediately preceding the data block are up to three header blocks as shown in Figure 2. These are optional and contain any supporting information associated with the contents of the data block. They are separated into floating point number (FPN), integer, and alphameric categories primarily as a convenience and to allow the automatic listing features to function properly.

The first block in the segment is the control block with contains pointers and labels which define the rest of the segment; it is structured as follows:

```
L, N, NB, NMB, NMF, (IP (I),
I=1, L), NF, NI, NA
```

L and N are set by the user in creating a new FEB file, as defined above. NB, not set by the user, is a segment sequence number generated by the FEB write subroutine. NMB and NMF are optional, but should be used to help identify each segment. IP is likewise optional and is for alphameric variable labels. NF, NI, and NA (The number of words in each header block, respectively) must be set by the user, but can be zero (independently) if some or all the

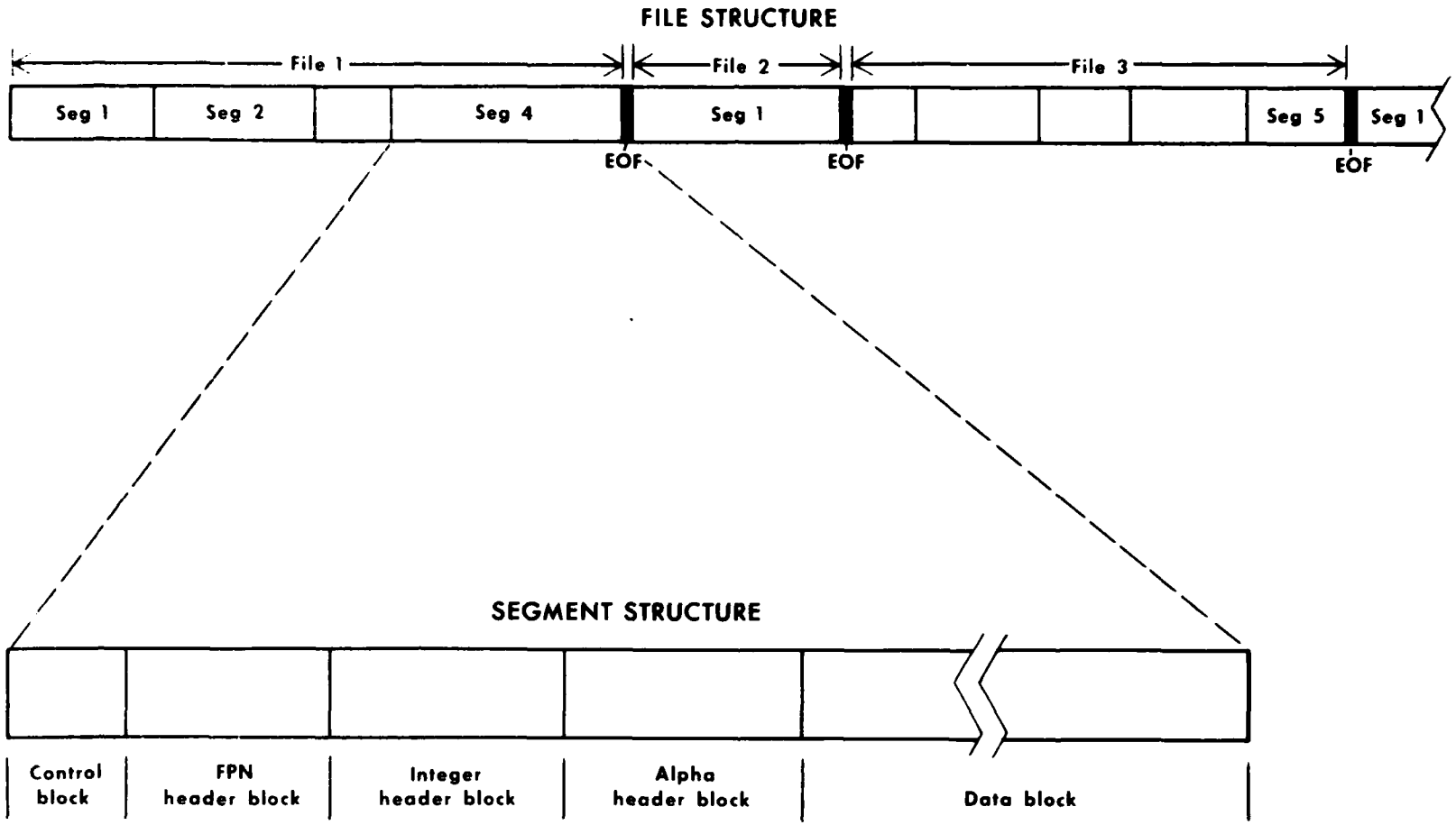

Figure 2 File and segment structures

header blocks are not desired. An example now is given:

Control Block:	2, 4, 1, [illegible],
	[illegible],
	-[illegible] - 2, 3, 4.
[illegible]:	[illegible],
[illegible]:	813, 21, 4.
Alphameric blocks:	[illegible]
	[illegible]
Data blocks:	27., 1[illegible]., 25., 10.,
	25., 2[illegible]., 24.5, 25.

The data in the FPN and integer blocks might be calibration data and quality control codes, for example. It is reemphasized that what is actually written to storage are the direct core images of the data with five nonformatted FORTRAN write calls.

Once the required COMMONS have been set up in the user program, data may be transferred between main memory and mass storage/tape with a simple subroutine call. The arguments in the call are the FORTRAN logical unit, the segment desired to be input or output, and a status flag which is set by the input/output routine. It is emphasized that on reading an existing FEB file it is not necessary for the user to know L, N or anything else about the data contained, provided the COMMONS arrays are large enough.

FORTRAN units 1-30 (excluding system limitations) may be accessed within a single execution, in any order.

All or part (or none) of the contents of a FEB segment may be automatically printed on each call by setting a flag in the COMMON block.

FEB files were first used, starting in 1975, at the Rosenstiel School of Marine and Atmospheric Science (University of Miami) for analyzing profiling current meter data. More recently, at the U. S. Naval Oceanographic Office, extensive use of FEB files has been made for physical oceanographic data. Between Fall 1977 and Fall 1979 software packages were developed for processing, editing and plotting CTD (conductivity, temperature, depth), XBT (expendable bathythermograph), and current meter data. All programs in these packages are based on FEB files and many are common to all three data types.

Included in the suite of nondata-specific utility routines for FEB files are programs for editing, filtering, listing, printer plotting restructuring (e.g., changing segment sizes), summarizing, interactive reviewing, and computing statistics. There is also a program which produces an ASCII character format tape of FEB file data for intercomputer transfers. These programs are in working files and are available for general use.

A more complete description, with program listings and examples, is available from the author.

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Tool for Extracting Core Tube Liners

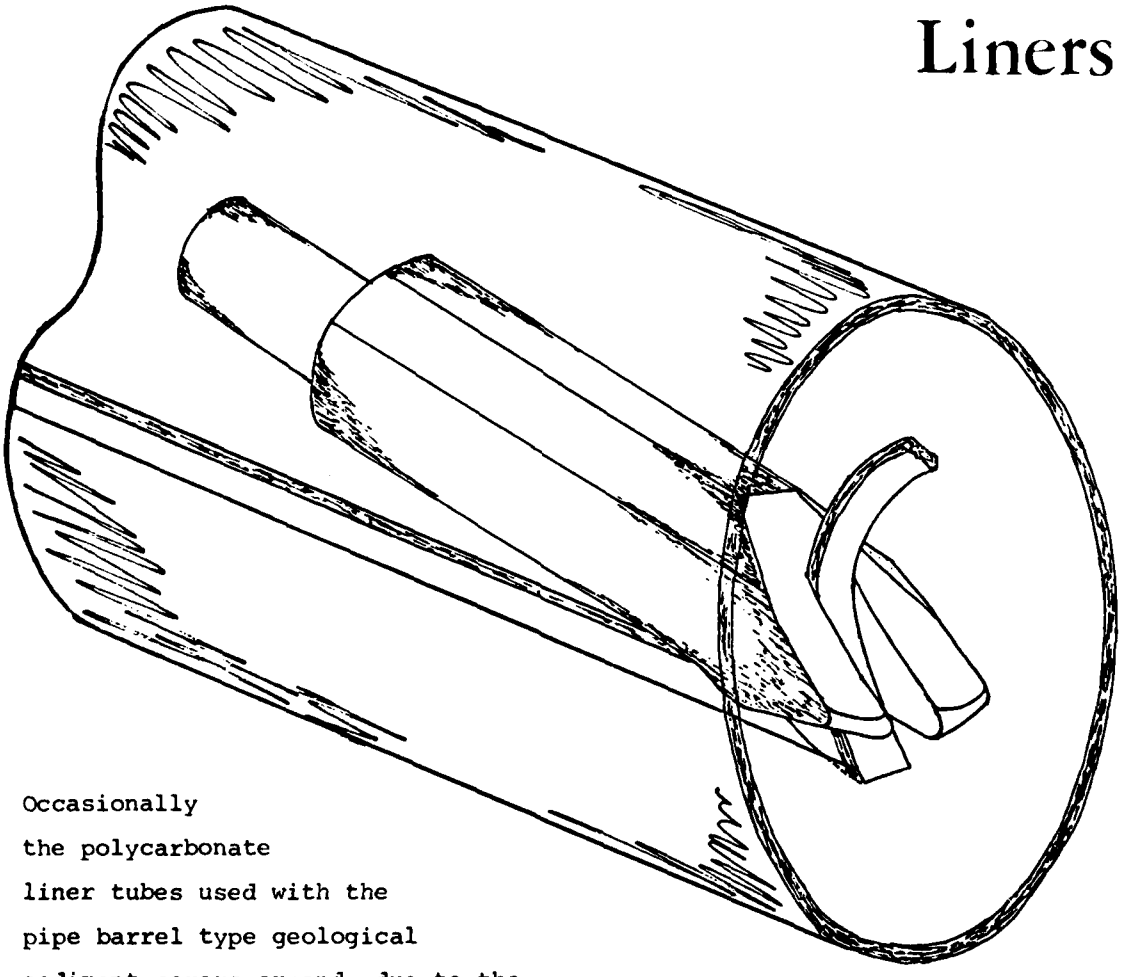

Figure 1.

Occasionally the polycarbonate liner tubes used with the pipe barrel type geological sediment corers expand, due to the stresses of the sediments against the inside walls, and become stuck in the barrel. If efforts to hydraulically push the liner out with the sediment sample in it fails, the core liner and sample is then destructively removed. This

short note describes a method which uses a specially ground chisel face that cuts a longitudinal segment out of the core liner for aid in removal.

The chisel, shown sketched in Figure 1, is made from 7/8-inch hexagon steel stock, 7-inches long. The rear shank has been machined down to 5/8 of an inch after a tapered chisel face has been shaped from the stock. A 1/4-inch groove is milled into the chisel taper at an angle 45 degrees with the bar axis. Secondly, material is removed from the bottom of the remaining chisel face on either side of the milled slot. This exposes a small segment of the chisel which is 1/4-inch wide and functions as a pickup for the material to be pared.

When a pipe extension is put on the shank of the chisel and pushed through the liner tube, starting anywhere on the end wall, it will cause a 1/4-inch segment of the liner wall to be cut out (as shown in the sketch). With the 1/4-inch wall segment removed, the liner diameter is reduced, which makes it easier to remove from the core barrel.

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Peter Kalk graduated from Michigan Technological University. He is currently a research assistant in the Oregon State University Geology Group.

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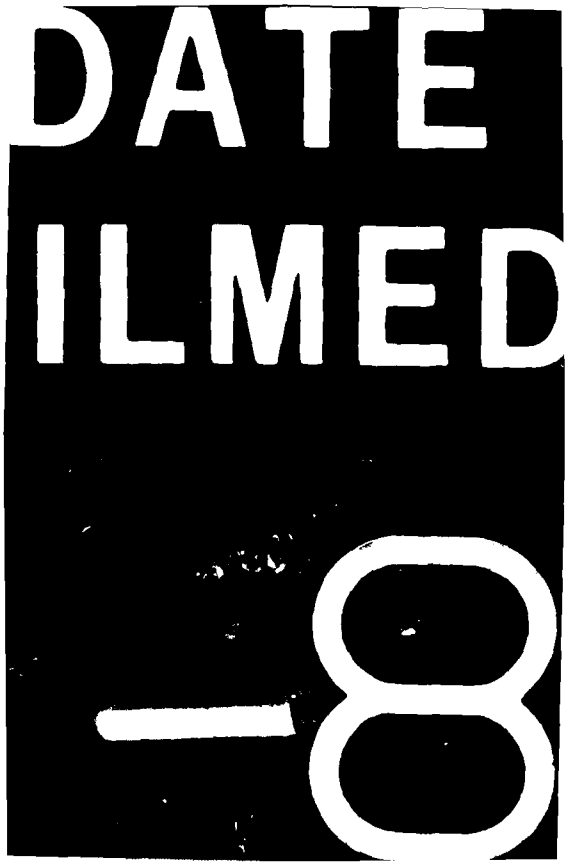
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